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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/533,805	10/26/2005	Raynald Labrecque	0055676-000013	4174

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BUCHANAN, INGERSOLL & ROONEY PC
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EXAMINER

TAI, XIUYU

ART UNIT	PAPER NUMBER
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1795

NOTIFICATION DATE	DELIVERY MODE
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10/20/2009

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

ADIPFDD@bipc.com

Office Action Summary	Application No. 10/533,805	Applicant(s) LABRECQUE ET AL.	
	Examiner Xiuyu Tai	Art Unit 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 June 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 96-133, 136-140, 142-162, 168192 is/are pending in the application.
- 4a) Of the above claim(s) See Continuation Sheet is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 96-98, 103-126, 132, 191 and 192 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>5/5/2005</u> . | 6) <input type="checkbox"/> Other: _____ |

Continuation of Disposition of Claims: Claims withdrawn from consideration are 99-102,105,106,127-131,133,136-140,142-162 and 168-190.

DETAILED ACTION

Response to Arguments

1. Due to applicant's amendment, objection to drawings and rejections under 35 U.S.C. 112, second paragraph are withdrawn.
2. The two references listed in IDS dated 5/5/2005 are considered and placed in the record.
3. Applicant's arguments with respect to claims 96-98, 103-104, 107-126, and 191-192 have been considered but are moot in view of the new ground(s) of rejection necessitated by applicant's amendment.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 96-98, 104, 107, 115, 117, 122, and 191 are rejected under 35 U.S.C. 102(b) as being anticipated by ABE et al (PG-PUB U.S. 2002/0051741).
6. Regarding claim 96, ABE et al disclose a reformer having an electrically heatable heater unit (ABSTRACT). The reformer comprises: (1) a metallic casing 13 (i.e. an enclosure); (2) the interior of the casing 13 (i.e. a reaction chamber) for encompassing a heater units 10/111 and a catalyst unit 12/17 (Figure 2; paragraph [0063]), wherein each heater unit has electrodes 14 (Figure 2; paragraph [0063]) and the catalyst unit 12 may contain metal (i.e. conductive

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material, paragraph [0082] & [0083]) in the form of porous honeycomb structure (Figure 2; paragraph [0090]); (3) a reactant fluid inlet 15 (Figure 2; paragraph [0063]); (4) an outlet 16 (Figure 1; paragraph [0063]); and (5) an external electric source to supply electricity (Figure 2; paragraph [0063]). The heater unit may be incorporated into the catalyst unit (paragraph [0093]). The reactant fluid contains an organic hydrocarbon compounds (i.e. gas to be reformed) and/or carbon monoxide (i.e. oxidizing gas). The catalyst unit 12 is not in contact with the casing 13 (Figure 2) and contains ceramic honeycomb carrier (paragraph [0090]), inherently teaching that the catalyst unit 12 is insulated from the metallic wall of the casing 13.

7. Regarding claim 98, the casing 13 is in a shape of pipe (Figure 2).
8. Regarding claim 104, ABE suggest metal element of group VIII as a catalyst (paragraph [0082]).
9. Regarding claim 97, the catalyst may contain iron (paragraph [0083]), reads on the instant claim.
10. Regarding claim 107, iron is a conductive metal, which is inherent to have the claimed physical characteristics.
11. Regarding claim 115, the reactant fluid inlet is perpendicular to the direction of the electronic flux generated (Figure 2), reads on the instant claim.
12. Regarding claim 117, the reactant fluid inlet 15 is at the one end of the casing 13 while the outlet 16 is at the other end of casing 13 (Figure 2), reads on the instant claim.

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13. Regarding claim 122, the interior of the casing 13 (i.e. a reaction chamber) contains a heater unit 11 and a catalyst unit 12 (Figure 2; paragraph [0063]) and the heater unit may be integrated with the catalyst (i.e. heater unit in contact with catalyst, paragraph [0093]). The heater-catalyst unit may contain metal alloy material (i.e. conductive material) and electrical resistance-heatable material such as carbide (i.e. semi-conductive material, paragraph [0094]).

14. Regarding claim 191, the catalyst may contain iron (paragraph [0083]), reads on the instant claim.

Claim Rejections - 35 USC § 103

15. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

16. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

17. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

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1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

18. Claims 114, 118-120, 132, and 192 are rejected under 35 U.S.C. 103(a) as being unpatentable over ABE et al (PG-PUB U.S. 2002/0051741) as applied to claim 96 above.

19. Regarding claims 114 and 119, ABE teaches that the catalyst unit 11 may be in the form of porous honeycomb structure (Figure 2; paragraph [0090]), but does not specifically disclose the claimed surface area and porosity index.

However, one having ordinary skill in the art would have realized to optimize the opening size of honeycomb structure in order to allow reactants/ products to pass through the catalyst unit without huge pressure drop.

20. Regarding claim 118, it is well known in the art that a transformer is used to energize electrodes for supplying electric power. With respect to the cited equation, it represents optimization of the power consumption based on process-limiting parameters, such as the geometry of the reactor, the type of lining material, the operating conditions, and gas to be reformed. The process limiting parameters do not differentiate the claimed structure from the reformer of ABE (see MPEP 2114). Furthermore, one having ordinary skill in the art would have been obvious to optimize power consumption in order to efficiently reform reactant gases with minimum power consumption.

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21. Regarding claim 120, the claimed flow rate is a manner of operating the reformer and does not differentiate the claimed structure from the reformer of ABE (see MPEP 2114).

22. Regarding claim 132, it has been held that a device having claimed relative dimension would not perform differently than the prior art device, the claimed device was not patentably distinct from the prior art device (see M.P.E.P. 2144).

23. Regarding claim 192, it is known in the art that the steel wool is basically a low carbon steel as is evident by the teaching of Maskalick (col. 3, line 46-47), reads on the instant claim.

24. Claims 103, 111, 112, and 123-125 are rejected under 35 U.S.C. 103(a) as being unpatentable over ABE et al (PG-PUB U.S. 2002/0051741) as applied to claim 96 above, and further in view of Takahashi (U.S. 5,746,985).

25. Regarding claim 103, ABE teaches that the heater unit including electrodes may have honeycomb structure (paragraph [0093]) which has a cylindrical pipe (i.e. a tubular member) and opening holes on a plate surface (i.e. hollow perforated disk) as shown in Figure 20, but does not teach the disk of heater unit in contact with catalyst. However, Takahashi discloses a reforming reactor having a heating resistor embedded in a catalyst (ABSTRACT).

Takahashi teaches a reforming reactor 15 having a honeycomb heating resistor 22 embedded upstream of a catalyst 10 (Figure 1 & 3; col. 3, line 65-67 & col. 5, line 13-16) and a hydrocarbon reactants supplied to the reforming reactor from upstream of the heating resistor 22 (col. 4, line 13-15). Takahashi also indicates

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that a honeycomb structured heating resistor embedded in a catalyst results in excellent heat transmission and fast reforming reaction (col. 3, line 3-9).

Therefore, it would be obvious for one having ordinary skill in the art to embed the heating unit with electrode in the catalyst unit of ABE as suggested by Takahashi in order to improve heat transmission, hence increasing reforming reaction.

26. Regarding claims 111 and 112, they are product (catalyst) by process (pre-treating) claim. Pretreating catalyst does not impart any unexpected significant properties of catalyst to the reformer. Therefore, the claimed product produced from pre-treating appears to have similar characteristics as the disclosed product. Because of the nature of product-by-process claims, the Examiner cannot ordinarily focus on the precise difference between the claimed product and the disclosed product. It is then Applicants' burden to prove that an unobvious difference exists. See *In re Marosi*, 218 USPQ 289,292-293 (CAFC 1983).

27. Regarding claim 123, ABE teaches that the heater unit may have honeycomb structure which has opening holes (i.e. hollow perforated disk) as shown in Figure 20 (paragraph [0104]). One having ordinary skill in the art would have realized to optimize the size of openings of ABE (hence the density of the openings) in order to allow reactants/ products to pass through electrodes without huge pressure drop.

28. Regarding claim 124, one having ordinary skill in the art would have realized to optimize the size of openings of ABE (hence the density of the

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openings) in order to allow gas reactants/conversion products to pass through electrodes without huge pressure drop.

29. Regarding claim 125, the openings of ABE are uniformly distributed on the electrodes (Figure 20), reads on the instant claim

30. Claims 108-110, 113, and 121 are rejected under 35 U.S.C. 103(a) as being unpatentable over ABE et al (PG-PUB U.S. 2002/0051741) as applied to claim 104 and 119 above, and further in view of Taguchi et al (U.S. 6,972,119).

31. Regarding claim 108, ABE teaches that honeycomb carrier of catalyst may have various types (paragraph [0124]), but does not specifically disclose the catalyst being in a form as claimed. However, Taguchi et al disclose a hydrogen producing apparatus having a reforming section using a shift catalyst (ABSTRACT). Taguchi teaches various shift catalysts (Examples 6-8) and suggests that stainless steel/ceramic wool be used as a honeycomb-shaped carrier (col. 16, line 29-30). Taguchi shows that honeycomb carrier with stainless steel/ceramic wool is an equivalent honeycomb structure with catalyst for reforming hydrocarbons. Because two honeycomb carriers are art-recognized equivalent, one having ordinary skill in the art would have found it obvious to substitute honeycomb carrier of ABE with stainless steel wool honeycomb carrier of Taguchi.

32. Regarding claim 109, ABE teaches that the catalyst unit 1 may be in the form of porous honeycomb structure (Figure 1; paragraph [0090]) and the honeycomb structure is shown in Figures 20 & 21 which has perforated surfaces. With respect to the required openings, one having ordinary skill in the art would

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have realized to optimize the size of honeycomb structure in order to allow gas reactants/conversion products to pass through the catalyst unit without huge pressure drop.

33. Regarding claim 110, Taguchi suggests that stainless steel/ceramic wool be using as a honeycomb-shaped carrier (col. 16, line 29-30).

34. Regarding claim 113, ABE/Taguchi suggests stainless steel wools as a catalyst honeycomb carrier, but does not specifically disclose the size of the stainless steel wool. One having ordinary skill in the art would have realized to optimize the fiber size, pore size/porosity of the fiber in order to achieve greater surface area, hence efficiently reforming the reactants.

35. Regarding claim 121, ABE teaches that the honeycomb structured catalyst unit 1 is made of Fe and other particles (paragraph [0102]), but does not teach the catalyst containing steel wool. However, Taguchi et al disclose a hydrogen producing apparatus having a reforming section using a shift catalyst (ABSTRACT). Taguchi teaches various shift catalysts (Examples 6-8) and suggests that stainless steel/ceramic wool be using as a honeycomb-shaped carrier (col. 16, line 29-30). Taguchi shows that honeycomb carrier with stainless steel/ceramic wool is an equivalent honeycomb structure with catalyst for reforming hydrocarbons. Because two honeycomb carriers are art-recognized equivalent, one having ordinary skill in the art would have found it obvious to substitute honeycomb carrier of Takahashi with stainless steel wool honeycomb carrier of Taguchi. The catalyst of ABE/Taguchi contains stainless steel wool as

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honeycomb carrier mixed with other compositions having average particle size of 44 micron.

36. Claim 116 is rejected under 35 U.S.C. 103(a) as being unpatentable over ABE et al (PG-PUB U.S. 2002/0051741) as applied to claim 96 above, and further in view of Petrescu et al (U.S. 3,419,490).

37. Regarding claim 116, ABE does not teach the reactant inlet⁵ being tangentially to the wall. However, Petrescu et al disclose a reactor for gas reforming from hydrocarbon gases by electro-cracking in direct current (ABSTRACT) . Petruscu teaches that the hydrocarbon gases enter the reactor through a tangentially extending inlet pipe 9, thus assuming a rotational movement in the chamber (Figure 2; col. 3, line 10-13). Therefore, it would be obvious for one having ordinary skill in the art to utilize a tangential entrance of reactants as suggested by Petrescu in order to promote rotational movement (better mixing) within the device of ABE..

38. Claims 126 is rejected under 35 U.S.C. 103(a) as being unpatentable over ABE et al (PG-PUB U.S. 2002/0051741) and Takahashi (U.S. 5,746,985) as applied to claim 123 above, and further in view of Hoecker (U.S. 6,615,588).

39. Regarding claim 126, ABE/Takahashi fails to teach the opening size of perforated plated being variable. However, Hoecker disclose an arrangement for using a plate shaped element with through openings for cooling a component. Hoecker teaches that the opening of the through openings 4 increase in the flow direction in proportion to the distance traversed of the cooling duct 5 (Figure 3; col. 5, line 44-46) in order to achieve uniform cooling effect in air flow (col. 2, line

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51-56). Therefore, it would be obvious for one having ordinary skill in the art to utilize the arrangement of variable opening size along the perforated plate as suggested by Heocker in the device of ABE/Takahashi in order to achieve uniform gas distribution along the electrode plate.

Conclusion

40. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Xiuyu Tai whose telephone number is 571-270-1855. The examiner can normally be reached on Monday - Friday, 7:30 AM - 5:00 PM.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jennifer Michener can be reached on 571-272-1424. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/X. T./

Examiner, Art Unit 1795

/Jennifer K. Michener/

Supervisory Patent Examiner, Art Unit 1795